REMARKS

This is responsive to the Official Action mailed July 14, 2004. Claims 1-8, 11 and 12 are rejected. Claims 9, 10 and 13 are withdrawn from consideration. Claims 1-13 are pending.

Applicants have amended the Specification and Drawings. In view of such amendments, the Examiner's objections to the Specification and drawings are by and large rendered moot. A few comments are in order. The citation of U.S. 5,733,069 and 5,567,933 were typographical errors and have been corrected in the instant amendment. Additionally, drawings have been amended to clear up objections raised by the Examiner. In this regard, reference character 120 has been deleted from the drawings. However, reference character 122 has been retained with respect to Figs. 2, 9, 10 and 12. In this regard, paragraph 75 has also been so amended to indicate "baffles 122" in place of the original numbering. As indicated in paragraph 75, first heat exchanger 20 is separated into stages that are divided by baffles 122 which direct the shell side flow and a cross-counter flow fashion with respect of the tube side flow. As set forth in paragraph 76, the heat exchanger's design is disclosed more fully in cross-section of view shown in Fig. 10. Heat exchanger 20 has spiral baffles 122 to direct the flow of gas in a cross-counter flow. Hence, both the numbering and the description is now consistent.

One change in the drawings, suggested by the Examiner, but not amended herein was the objection to Fig. 10 in which the Examiner stated that reference number 122 is pointing to spaces between baffles. Applicants submit that reference "122" in Fig. 10 is in fact pointing to the baffles themselves.

The Examiner rejected claims 1-3, 5-8 and 11-12 under 35 U.S.C. §103(a) as being unpatentable over Gottzmann et al. in view of Nataraj et al.

Applicants' invention as recited in claim 1 has first and second heat exchangers located at opposite ends of a reactor vessel. The first heat exchanger heats a preheated oxygen containing stream by indirect heat exchange with an oxygen depleted steam. In the second heat exchanger, a reactant stream is heated by indirect heat exchange with a synthesis gas product stream. A catalyst bed is located within the reaction section to promote the reaction of the permeated

oxygen. The first heat exchanger, the second heat exchanger and the oxygen transport membrane tubes are each supported within the reactor vessel independently of one another so that they can expand or contract.

Although Gottzmann et al. has a reaction vessel and oxygen transport membrane tubes that are supported within the reaction vessel so they are free to expand and contract, Gottzmann et al. does not have a first heat exchanger and a second heat exchanger located at opposite ends of the reactor vessel that are independently supported. In Gottzmann et al. Fig. 2, the high end transport tubes 28 are free floating within a shroud 38. Concentric inner tube 30 supplies or withdraws the reaction side gases. As shown in Fig. 1 the flow of the oxygen containing gas stream 36 is directed by baffles 40 that are arranged with varied axial spacing. Local heat transfer coefficients between the shell-side gas stream in shroud 30 can be controlled by selection of the cross-flow velocity, both of which depend upon baffle spacing. This allows is for the temperature of iron transport tubes to be maintained at a relatively uniform level to ensure the most efficient utilization of the reactor. As the oxygen containing gas flows through baffles 40, it will be heated up to reaction temperature at the base of the shroud tubes at operating temperature.

Gottzmann et al. is to be contrasted with the present invention as recited in claim 1. In claim 1 the oxygen containing stream is heated by indirect heat exchange with an oxygen depleted stream in a first heat exchanger and the reactant stream is heated by indirect heat exchange with the synthesis gas product stream. Hence, Gottzmann et al. does not have the heat exchangers of the present invention nor their independent support.

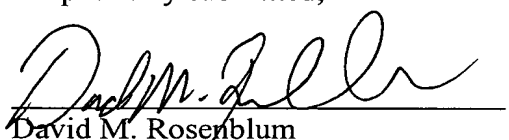
The Nataraj et al. patent does nothing that would supply such elements that are missing in Gottzmann et al. in that it discloses the use of a catalyst that can be applied to the surface of the reactant side of the membrane or alternately a granular form of the catalyst may be placed adjacent to the membrane surface.

It is therefore apparent that claim 1 is not rendered obvious by the Gottzmann et al., Nataraj et al. rejecting combination and is in allowable form. Since claims 1-8, 11 and 12 are all dependent on claim 1, such claims should be

allowable on the same basis. Furthermore, Applicants request withdrawal of the restriction requirement being that claim 1 is allowable form.

In view of the amendments and the remarks set forth above, consideration of the rejection and allowance of all claims is respectfully requested. Since the case is in condition for allowance, prompt and favorable action is hereby respectfully solicited.

Respectfully submitted,



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